

# Nuclear Division News



A Newspaper for Employees of the Nuclear Division, Union Carbide Corporation

Vol. 7, No. 20/September 30, 1976

## inside . . .

No, the intriguing structure below is neither leftover trusswork for the new Solway bridge nor an erector set gone wild. Its true identity is revealed on page 6, in a story spotlighting the unusual after-hours occupation of two ORNL men.

Other features in this issue:

- 'IR 100' awards announced . . . . . page 3
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- Dr. Lincoln on breast xeroradiographs . . . . . page 7
- ORNL lineman commended . . . . . page 8

### Brooks concludes Lecture series Tuesday evening

Harvey Brooks, Benjamin Pierce Professor of Technology and Public Policy at Harvard University, will deliver the final lecture in the series of six Oak Ridge Bicentennial Lectures next Tuesday, October 5. Brooks will speak on "The Future Role of Nuclear Energy in the Context of Alternative Energy Systems."

The public is invited to attend the lecture, scheduled for 8 p.m. at the American Museum of Atomic Energy. Oak Ridge National Laboratory has sponsored the series.

## Fraas, Googin, Satchler named Union Carbide Corporate Fellows



Arthur P. Fraas



John M. Googin



G. Raymond Satchler

Three members of the Nuclear Division, Union Carbide Corporation, have been named Corporate Fellows. Arthur P. Fraas, Manager of the High Temperature Systems Group in the Energy Division, Oak Ridge National Laboratory, has been named a Corporate Engineering Fellow; and John M. Googin, the Nuclear Division's Senior Staff Consultant in the production organization and G. Raymond Satchler, a member of the Physics Division at ORNL, have been named Corporate Research Fellows.

In announcing the awards, Roger F. Hibbs, President of the Nuclear Division, explained that designation as

a Corporate Fellow is one of the highest honors which can be bestowed on research personnel by Union Carbide Corporation. In order to receive this honor, the individual must be recommended by the president of the division in which he works. His nomination must then be approved by the Corporate Technology Committee and endorsed by the Corporate Management Committee.

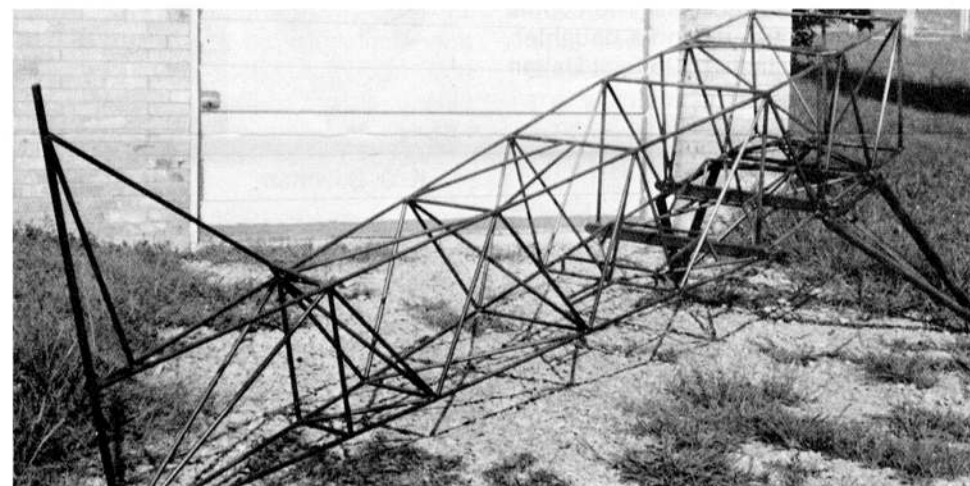
### Energy contributions

Fraas' selection was based on his contributions to the nation's energy programs through the innovation and development of new concepts and systems for power generation and conversion. These have included in the past designs of nuclear reactors for aircraft propulsion and for space auxiliary power, and more recently concepts for thermonuclear reactor power plants.

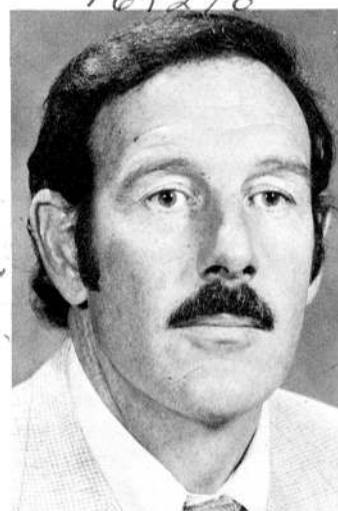
Under his leadership, ORNL is at present carrying out the development of two of his concepts. One is a topping cycle for central station power plants that uses potassium vapor as the working fluid and appears capable of increasing thermal efficiency to near 50 percent. The other is a power system based on a fluidized-bed coal burner and a closed-type air turbine that is capable of efficiently providing electricity and heat for residential and commercial complexes and small industries.

Fraas received his bachelor's degree in mechanical engineering from the Case Institute of Technology, and his master's degree in aeronautical engineering from New York University. He joined Union Carbide Corporation at the Oak Ridge National Laboratory in 1950.

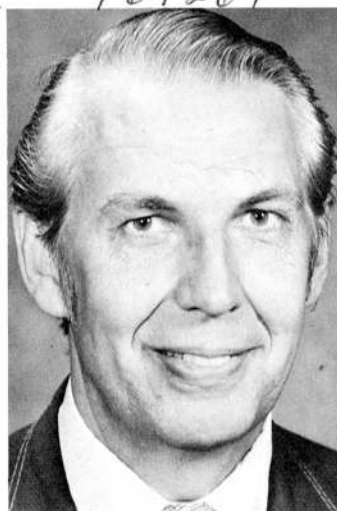
He is the author of more than 250 papers and reports and has published three books. He is a Fellow of the



## Case announces Y-12 organizational changes



D. J. Bostock



W. S. Dritt



W. H. Thompson



R. D. Williams

Jack M. Case, Manager of the Oak Ridge Y-12 Plant, has announced several organizational changes, including the establishment of a new position. The changes, which become effective immediately, are as follows:

Roy D. Williams, Superintendent of the Metal Preparation Division, has

been appointed to the new position of Production Manager-Y-12, reporting to the Y-12 Plant Manager. Reporting to Williams will be the Fabrication, Assembly and Metal Preparation Divisions.

D. Jeffrey Bostock, Product Engineering Department Superin-

tendent, is appointed Division Superintendent of Metal Preparation, replacing Williams.

William H. Thompson, Quality Evaluation and Technical Support Department, is appointed Product

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## Heads Regional, Urban Studies



Richard M. Davis

Richard M. Davis has been named head of the Regional and Urban Studies Section in the Energy Division at Oak Ridge National Laboratory. He succeeds Richard Olsen, who has served as acting head of the section since 1975 and left the Laboratory in June.

The principal mission of the Regional and Urban Studies Section is to integrate social and economic research experience into the planning, development, and operations of alternative energy systems on a national and regional basis. Its staff members analyze the social and

economic effects of the development and use of energy resources and the siting of energy facilities.

Davis is a native of Boston, Mass. He received his bachelor's degree in physical geography from Boston University in 1963, and earned an M.A. degree in political science from Trinity College in 1969. In 1974, Davis received his Ph.D. in geography and economics from Ohio State University.

Before joining the ORNL staff, Davis had served as manager of the Regional Centers Program at Battelle-Columbus Laboratories in Ohio where he was responsible for programs designed to transfer science and technology to agencies concerned with development of state and local regions.

He also served as project leader of recent studies to develop: (1) an economic-environmental trade-off model for land-use planning; (2) an analysis of urban public policy and political institutions for water quality management on Lake Erie; and (3) a regional air quality model for regional planning.

Davis was previously associated with the Travelers' Research Corporation and Geotechnics and Resources, Inc. He is a member of the Association of American Geographers and the American Society for Public Administration.

Davis, his wife, Beverly, and their children, Sandy and Richard Jr., live at 121 Barrington Drive, Oak Ridge.



Robert B. Barker



Gary L. Bean



William E. Ramsey

## Three promoted at Y-12

Three promotions have been announced at the Y-12 Plant.

Gary L. Bean has been named industrial hygienist in the Health Center. He joined Union Carbide this year and had previously worked part-time at Oak Ridge National Laboratory.

A native of Knoxville, Bean has a bachelor's degree from the University of Tennessee and his MPH in industrial hygiene, also from UT.

He is married to the former Donna Greer and they have one daughter, Kelley. The Beans live at 3700 Sutherland Ave., Knoxville.

Robert B. Baker, a former machinist in Product Certification, has been promoted to supervisor trainee. He has been with Union Carbide for 19 years.

A native of Lynch, Ky., he is married to the former Edith Alvis. The couple has a son, Robert Jr., and a daughter, Deborah. They live at 105 East Dalton Road, Oak Ridge.

William E. Ramsey was promoted to a control center clerk in the Shift Superintendents and Utilities Division. He has been with Union Carbide for 18 years and previously worked in the Stores Department.

A native of Rossville, Ga., he is married to the former Jackie Needham. The couple has a daughter, Donna, and a son, Mike. Their home is at 106 E. Magnolia Lane, Oak Ridge.

## Bowman, Gosslee ASA Fellows



K. O. Bowman

D. G. Gosslee

Kimiko O. Bowman and David G. Gosslee, statisticians in the Mathematics and Statistics Research Department, Computer Science Division, were named Fellows of the American Statistical Association at the 136th meeting of the Association in Boston last month.

Bowman's citation reads, "for contributions to the quantitative assessment of distributional properties of estimators and small samples; for skill in programming for a wide variety of applied statistical problems, and effective consulting and collaboration with scientists and engineers."

Gosslee was cited "for outstanding leadership in promoting the use of sound statistical techniques in biology and the physical sciences, and for excellence as a statistical consultant and developer of statistical consultants."

Bowman joined the Nuclear Division in 1963. She holds a B.S. degree from Radford College in Virginia and an M.S. and Ph.D. from Virginia Polytechnic Institute and State University. Bowman lives at 110 W. Irving Lane, Oak Ridge.

Gosslee, who joined the Nuclear Division in 1961, holds the B.S. degree from Minnesota State College, the M.S. from Iowa State University and the Ph.D. from North Carolina State University. He resides at 106 Indian Lane, Oak Ridge.

Bowman's and Gosslee's citations bring to four the number of Fellows of the American Statistical Association who are members of the Mathematics and Statistics Research Department. Previous recipients are Donald A. Gardiner and V. R. R. Uppuluri.

## retirements



Bray



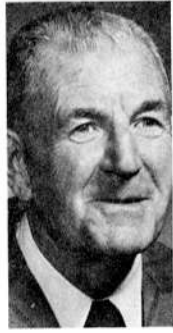
Jones



Lynn



McBee



McKeethan



Murrin

Six employees are among September retirees at Oak Ridge National Laboratory.

Nathaniel T. Bray, a facility records supervisor in Information Division, retired after 30 years company service. His home is at 310 Cross Street, Clinton.

Katherine P. Jones retired from her position as a biological laboratory technician in Biology Division. A 24-year employee, she lives at 135 Morningside Drive, Knoxville.

Elmus Cecil Lynn ended more than 32 years company service. A research associate in Analytical Chemistry Division, he lives at 106 West Magnolia Lane, Oak Ridge.

Claude McBee has taken early retirement after 31 years of company service. He was a buildings and grounds supervisor in Operations Division. His home is at 6732 Greenbrook Drive, Route 22, Knoxville.

Roy V. McKeethan retired from his position as an instrument technician in Instrumentation and Controls Division, ending more than 25 years

company service. He lives at 392 West Outer Drive, Oak Ridge.

William H. Murrin, a 27-year employee, retired from his position as a



Anderson



Coffey



Cotter



Rackley



Stuckey

Seven Y-12ers will retire today with company service totaling more than 175 years.

Duane P. "Andy" Anderson, shift superintendent in the Plant Protection Department, has been with Union Carbide since 1944. He lives at 171 Northwestern Ave., Oak Ridge.

Bernard J. Beck, a metal fabricator in the General Can Fabrication Shop,

mechanical instrument maker in Plant and Equipment Division. Murrin lives at 111 Porter Road, Oak Ridge.

will retire to his 610 Pennsylvania Ave., Oak Ridge, home. He has been with Union Carbide since 1950.

Winston C. Coffey, of Route 4, Lenoir City, has 22 years of company service. He is an instrument mechanic in the Research Services Department.

L. George Cotter retires from his position as experimental machinist in

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## Three 'IR 100' awards to Division researchers

Oak Ridge researchers received three of this year's "IR 100" awards presented by the magazine, **Industrial Research**, for the 100 most significant new technical products of 1976. The awards were presented September 23 at the Museum of Science and Industry in Chicago.

Those honored included five Oak Ridge National Laboratory staff members and one affiliated with the production organization of the Nuclear Division. Joining them for the presentation was ORNL Director Herman Postma.

The researchers and their developments are:

- Edward H. Kobisk and Thomas C. Quinby, ORNL, for a method of fabricating ceramic wire into very accurate, low-cost radiation monitors (dosimeters) for nuclear reactor applications;

- G. Wayne Clark, ORNL, jointly with Alan T. Chapman, Georgia Institute of Technology, for a new type of laboratory-grown composite crystal with superior mechanical and physical properties and temperature resistance, which can be used in a variety of electronic devices; and

- Alicia Compere and William Griffith, ORNL, jointly with John M. Googin, senior staff consultant to the Nuclear Division's production organization, and Stanley R. Smith, of the Norton Company, Akron, Ohio, for "ANFLOW," an energy-conserving liquid waste treatment system that permits the recovery of usable

chemicals and fuel gas from organic-bearing industrial waste streams and municipal sewage.

### Wire monitors radiation

Kobisk and Quinby, members of the Solid State Division staff, were cited for "Ceramic Wire Neutron Dosimetry Materials," used to monitor neutron flux and energy distribution in reactor cores and areas outside the core. No other measurement materials are known that can provide less expensive dosimetry.

Previously, fabrication required manual loading of oxide powder into very small capsules (less than 10 millimeters long and two millimeters in diameter). This made it very difficult to assure accuracy in the amount of powder contained in each capsule, and resulted in a significant loss of dosimeter material.

With the new development, a very thin oxide wire, 0.5 millimeters in diameter, is formed from oxide powder by an extrusion technique. These dosimeter wires are uniformly dense and do not produce dust fragments when cut or handled. According to the researchers, this method reduces cost and human error involved in manufacturing dosimeter materials. The amount of valuable isotope needed also is reduced because there is less waste from spillage.

Some of the oxide powders that have been used by the scientists in preparing ceramic-wire dosimeters are uranium, neptunium, scandium,

plutonium, nickel and cobalt oxides. The capsule material used to house the wire is most frequently made of ultrapure vanadium, platinum, or stainless steel.

### Laboratory-grown crystals

Clark, leader of the Crystalline Physics Group in Metals and Ceramics Division, and Alan Chapman, professor of ceramic engineering at Georgia Institute of Technology, were honored for growing crystals of a completely new type of material, "Metal Oxide-Metal Eutectic Composites."

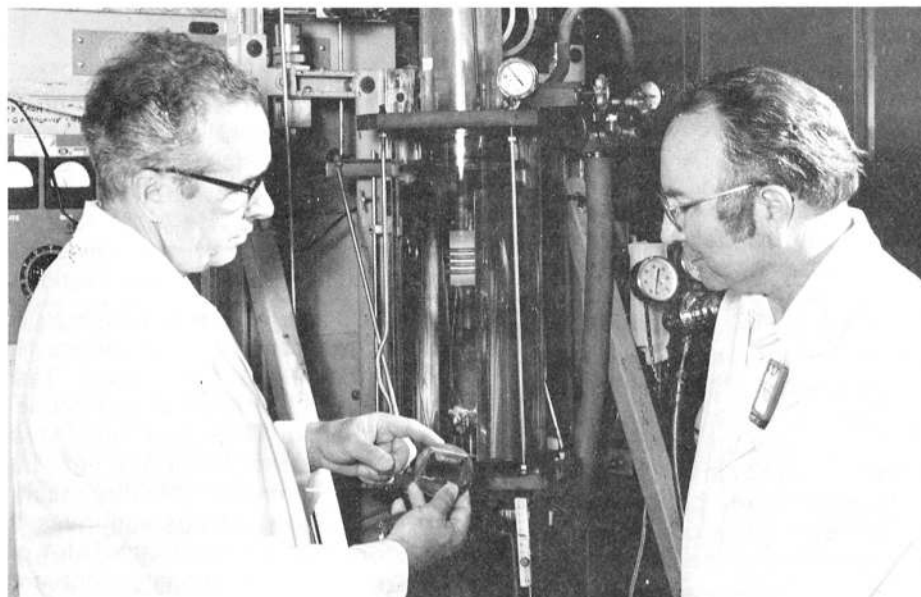
This material is superior in its physical and mechanical properties and has shown a strong resistance to thermal stress. It consists of millions

of ultrafine metallic fibers within an insulated ceramic matrix. These fibers emit electrons when placed in an electric field.

The researchers believe that these composites have potential application as field and thermal electron emitters, high temperature magneto-hydrodynamic electrodes, turbine components, electron emitting guns, refractory bodies of enhanced mechanical strength and toughness, and solid state device components.

The procedure for growing the material begins with a mixture of metal and oxide powders which is pressed and heated into a rodlike substance. The rod, which is dense and

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**AWARD-WINNING CRYSTALS**—Collaboration between G. Wayne Clark (left), ORNL, and Alan T. Chapman, Georgia Institute of Technology, has resulted in the growth of crystals of a new type of material for use in mechanical or electronic devices. Clark holds a sample of the material called "metal oxide-metal eutectic composites." The apparatus in the background is the radio-frequency induction heater where the material was grown.



**'ANFLOW' DEVELOPERS**—John M. Googin (left), William Griffith and Alicia Compere, Nuclear Division researchers and developers of the ANFLOW process, check sampling apparatus on the columns of a small pilot plant. ANFLOW is a novel technique for biologically treating liquid wastes while producing usable products such as methane gas. Not pictured is Stanley Smith, Chemical Process Products Division of the Norton Company, a co-developer of the process.



**WIRE FOR DOSIMETERS**—ORNL researchers Edward Kobisk (left) and Thomas Quinby received an IR-100 award for developing a technique for fabricating ceramic wire into accurate radiation monitors (dosimeters) which measure neutron flux and energy distribution in nuclear reactors. The thin wire, about 0.5 millimeters in diameter, is made by extruding an oxide powder containing a binder material. The wire is then placed in a ceramic tube (held by Quinby) and sintered at temperatures up to 1800° F to produce a coherent, structurally strong ceramic.



## Jacobs to head Environmental Policy Analysis Program

The appointment of Donald G. Jacobs as manager of the newly established Environmental Policy Analysis Program has been announced by Herman Postma, Director of Oak Ridge National Laboratory.

The purpose of the program is to assist the Energy Research and Development Administration's Office of Environmental Policy Analysis (OEPA) in the analysis of environmental policy questions relating to the development and utilization of energy. The OEPA, which is located in the office of the ERDA Assistant Administrator for Environment and Safety, provides input for decision-making by ERDA management and higher councils of government.

In his new position, Jacobs will report to Chester R. Richmond, ORNL associate director for Biomedical and Environmental Sciences.

Jacobs is a native of Ogden, Ill. He received his bachelor's degree in agricultural sciences from the University of Illinois.

After serving in the Army, Jacobs earned a master's degree in chemistry and a Ph.D. in agronomy, also from the University of Illinois. In 1957 he came to the Laboratory as a National Academy of Sciences/National Research Council post-doctoral research associate. He joined the regular staff of the Health Physics Division in 1958.

During a two-year leave of absence from the Laboratory in 1971, Jacobs served as head of the Waste Management Section, Nuclear Safety and Environmental Protection Division of the International Atomic



Donald G. Jacobs

Energy Agency.

Prior to his recent appointment, Jacobs held various positions in Health Physics, including chief of the program on Analysis and Assessment of Health Effects. He most recently served as head of the Division's Assessment and Technology Section.

Jacobs holds membership in several professional organizations. He is a member of the Tritium Task Group, SC-38, of the National Council on Radiation Protection and Measurements, and chairman of the program committee of the Health Physics Society. Jacobs continues to serve as a consultant to the IAEA on radioactive waste management and effluent control technology.

Jacobs resides with his wife, Mary, and their son John at 123 Wendover Circle in Oak Ridge. Their daughter, Libby, teaches at Central High in Memphis.

## question box

If you have questions on company policy, write the Editor, Nuclear Division News (or telephone your question in, either to the editor, or to your plant contact). Space limitations may require some editing, but pertinent subject matter will not be omitted. Your name will not be used, and you will be given a personal answer if you so desire.

### More pension for retirees?

QUESTION: Is there a possibility that retired persons might receive an increase in their pension? The last one was several years ago.

ANSWER: There are not any plans at this time to increase the monthly pension benefits of retired employees.

### Personal property items

QUESTION: What is Company policy regarding bringing personal property such as coffee makers, microwave ovens, etc., on the job?

ANSWER: Company policy regarding personal property on Company premises is expressed in "You at Union Carbide", page 34, Regulation No. 6, as follows:

"You are not allowed to bring into the plant personal property other than that required in the performance of your work, except those items authorized by your supervisor, or small personal items which will not interfere with work performance or create safety or personnel problems."

Of the two items you mentioned, the coffee maker would probably be permitted by your supervisor; whereas a microwave oven would not be allowed. Due to safety considerations, the only microwave oven presently permitted for new installations on Company premises are those installed by the Company or by the installation's vending machine contractors. All microwave ovens must comply with Company installation and safe operating procedure, and periodic inspections are held by Health Physics/Industrial Hygiene on a regular basis.

### Parking lot problem

QUESTION: Employees in Y-12 Building 9103, who leave work from one to five minutes early in the afternoon, are by-passing Pine Ridge Portal and exiting at West Portal, which is creating a bottleneck at the red light. Can something be done about this afternoon headache?

ANSWER: Employees are expected to work until the close of their work schedule and are not permitted to leave early without supervisory approval. Any abuses will be corrected.

A recent survey at the portal in question indicated smooth traffic flow with no significant tie-up or delay.

We urge everyone's continued concern for safety and courtesy in parking lots. The plant traffic committee periodically evaluates conditions, and it considers the West Portal traffic designs adequate and reasonable.

### Job code and salary

QUESTION: Are there any conditions under which an individual may be in a job code yet does not receive the minimum salary (80 percent of the job rate) of the stated code?

ANSWER: There are conditions under which an individual may be classified in a code and not receive the minimum salary of the code. There are also conditions under which an individual classified in a code would receive more than the maximum salary of the stated code. Both conditions are abnormal. The most common situation where a person is paid less than the minimum of the range is at the beginning of a program year when, on occasion, an individual low in the salary range drops out of the range temporarily when the range rates are increased.

## safety scoreboard

Time worked without a lost-time accident through September 24:

Paducah.....	9 Days	111,000 Man-Hours
ORGDP.....	43 Days	1,298,000 Man-Hours
Y-12 Plant.....	201 Days	5,833,000 Man-Hours
ORNL.....	7 Days	218,137 Man-Hours



**NOBEL LAUREATES** — During a recent visit to Oak Ridge National Laboratory, Paul A. M. Dirac, Nobel Prize winner and world-famous authority on quantum mechanics, discussed the existence of superheavy elements which was reported by scientists at ORNL, Florida State University and the University of California at Davis. Seated, from left, are Dirac, who is currently a physics professor at Florida State University; Robert V. Gentry, ORNL researcher; and Eugene P. Wigner, first director of the Laboratory and also winner of a Nobel prize. Standing are Floyd Culler, ORNL deputy director, and F. Bary Malik, Indiana University.

### LOST

Woman's diamond engagement ring (white gold, Tiffany setting) in the vicinity of K-1004 area, ORGDP. Finder please contact Cynthia Eubanks, extension 3-3858.

## retirements

(Continued from page two)

the Material Specimen Shop. His home is at Route 5, Seymour. Cotter has 25 years of company service.

John W. Powell, who joined Union Carbide 26 years ago, will retire to his home in Athens, Tenn. Powell is an outside machinist in the Process Maintenance Department.

Hubert C. Rackley Sr., a carpenter in Buildings, Grounds and Maintenance Shops, has been with Union Carbide since 1959. He lives at Route 4, Powell.

Charles L. Stuckey, a stockkeeper in the Materials Department, retires this month ending more than 32 years with Union Carbide. His home is at Route 6, Clinton.

## wanted



### ORNL

**CARPOOL MEMBER**, vicinity of Country Club Apartments and Landmark subdivision off Middlebrook Pike, Knoxville, to East Portal, any shift. Call Jackie Sims, plant phone 3-1486, home phone 693-8829.

### ORGDP

**RIDERS WANTED** for vanpool from east end of Oak Ridge or Jack and Jill Nursery to Portal 2 or 4. Call 482-3649.

### Y-12 PLANT

**RIDERS WANTED** for vanpool from North Knoxville (Magnolia) to all portals via I-40 and Mabry Hood Road, straight day. H. A. Hanna, plant extension 3-7988, home phone 522-0587.

**RIDE WANTED** from Norris to North Portal, straight day. Albert Achley, plant extension 3-5947, home 494-7754.



# 'Fire Prevention Week' observance set in October

In 1975, 5,100 persons in the U.S. died in home fires. Another 150,000 suffered disabling injuries. Fires and burns were the principal cause of death in home accidents for age groups 1 to 14 years and 45 to 64 years.

These are facts taken from a general information sheet being distributed to Y-12 Plant employees as a part of that installation's observance of Fire Prevention Week, beginning Monday. All four Nuclear Division sites have developed special programs promoting employee awareness of basic fire prevention methods.

In most locations, films will be shown and educational literature distributed. At Y-12, handouts will include planning kits for nighttime home fire escape. Oak Ridge National Laboratory's observance will feature a Debris Pickup program and special fire training sessions for employees.

As part of the Fire Prevention Week activities at the Paducah Gaseous Diffusion Plant, special emphasis is being given to home smoke detectors. Other topics being stressed to promote employee awareness of basic fire prevention responsibilities are hazard elimination, proper fire reporting, evacuation planning and use of portable fire extinguishers. Safety meetings covering these topics and a thorough plant-wide inspection to uncover fire hazards will be conducted throughout the week.

At ORGDP, an inter-divisional committee has been formed to plan Fire Prevention Week activities. ORGDP's program will also include fire prevention literature.

Employees desiring more information about Fire Prevention Week activities at their locations should contact their facility's fire protection department.

PH 76-2210



**FIRE PREVENTION COMMITTEE** — Members of ORGDP's Fire Prevention Week Committee meet to finalize plans for the week's activities. Seated, from left, are Elaine Alexander, Gaseous Diffusion Development; L.E. Wheeler, Operations; B.I. Wyatt, Computer Services; F.B. Duncan, Operations Analysis and Planning; B.N. Strunk, Purchasing; and D.E. Tidwell, Separations Systems. Standing are H.E. Alexander, Finance, Materials and Services; W.D. Hartman III, Barrier Manufacturing; N.E. Sparks, General Accounting; G.V. Tucker, General Accounting; C.B. Tolliver, Engineering; R.W. Hayes, Construction Engineering; J.R. Hutton, Security and Plant Protection (committee co-chairman); P.F. Shorten, Technical; and J.D. Hoogesteger, Security and Plant Protection (chairman). Not present for the photo were J.L. Reagan, C.L. Stair, R.W. Ray, L.J. Carpenter and T.A. Angelelli.

## Nuclear materials group elects Cardwell

Roy G. Cardwell, Finance and Materials Division, Oak Ridge National Laboratory, was elected chairman of the 500-member Institute of Nuclear Materials Management, Inc., at its 17th annual meeting in Seattle recently.



R.G. Cardwell

Cardwell, who has served as vice chairman of the organization for the past two years is, as chairman, responsible for the administration of the society, a non-profit organization of individuals working in governmental, industrial, and academic institutions where nuclear materials are used.

He is a co-author of a book on nuclear materials management and author of several publications on con-

trol of nuclear materials in fabrication and research.

A 24-year Union Carbide employee, Cardwell is a graduate of the University of Tennessee and is one of 75 persons to be named Certified Nuclear Materials Managers by INMM. He and his wife, Barbara, live in Lenoir City.

## Clark to get ANS Best Paper Award

Walter E. Clark, Chemical Technology Division at Oak Ridge National Laboratory, has been selected to receive the Best Paper Award for 1976 by the American Nuclear Society's (ANS) Nuclear Fuel Cycle Division.

Clark's paper, "Immobilization of <sup>129</sup>I as Barium Iodate with Portland Cement," was selected for its significance and effectiveness. The



**SMOKE DETECTORS PROTECT**—Special emphasis is being placed on home smoke detectors in Fire Protection Week activities at PGDP. Here Velda Bartlett (right), an employee in Paducah's Company Store, shows Sandy Cox of the Inspection Department a home smoke detector being made available to Paducah employees at a special group discount rate.

## Union Carbide Corporate Fellows

(Continued from page one)

American Society of Mechanical Engineers and during his career he has chaired or served on many advisory committees and boards.

### Zirconium-hafnium separation

Googin joined the Manhattan Project at the Oak Ridge Y-12 Plant in 1944 and he has served in a variety of capacities in the research and development functions at Y-12. He contributed the first production plant for the separation of zirconium from hafnium. This refined metal made possible the nuclear reactor for the Nautilus submarine and it has been used in most naval reactors since. The experience and equipment which made the zirconium-hafnium separation possible came from extensive development work by Googin on the problems of the recovery and purification of uranium from the complex mixtures of elements which were generated in the early efforts to separate uranium isotopes by the electromagnetic process.

Some of his contributions include development of many techniques of metal working and ceramic production to meet the requirements of the nuclear weapons program, development of a much improved process for lithium isotope separation and specifications of many of the design and operating parameters of the production plants, development of improved techniques for enriched uranium recovery and for the production of uranium compounds and

alloys, and research and development to enable production of improved fuel elements for nuclear-powered rocket applications.

Googin received his bachelor's degree in chemistry from Bates College and his Ph.D. in physical chemistry from the University of Tennessee. In 1967, he received the U.S. Atomic Energy Commission's Ernest Orlando Lawrence Memorial Award, with a citation in chemistry and metallurgy. He holds or is the co-holder of more than a dozen patents and is the author of a substantial number of publications.

### Nuclear theorist

Satchler is considered a world authority on the theoretical interpretation of nuclear reactions. He was one of the first nuclear theorists to implement the much more refined and detailed treatment of nuclear reactions made possible by the use of computers. He and his colleagues developed computer codes which are now standard tools throughout the world for the analysis of nuclear reactions.

At the same time that he led the way in applying computers to nuclear studies, Satchler made innumerable important contributions to the physical understanding of nuclear reaction processes. Perhaps more than any other nuclear reaction theorist, he has collaborated closely with experimentalists in interpreting the results of experiments and encouraging new experiments to provide better tests of theory. As a consequence, he has had great influence on the direction of nuclear-reaction physics.

Satchler was educated at Oxford University where he received his Ph.D. He joined Union Carbide at ORNL in 1959. He has served on the sub-panel on the development of nuclear physics of the National Research Council Physics Survey Committee and, from 1973 to 1975, served on the council of the Division of Nuclear Physics of the American Physical Society.



# It's 'up, up and away' -- in aircraft built at home

By Carol Grametbauer

These days the trend is towards "do-it-yourself." All around us, folks are growing their own vegetables, paneling their own family rooms, even building their own homes from the ground up.

So, if you love flying and the machines that take you there -- why not a home-built aircraft?

It was a thought that became implanted in the minds of Gene Lewis and Leon Ridenour -- and neither man was content to let it go at just a thought. Both are now flying aircraft they built at home.

## Met at EAA

Lewis is a painter in Oak Ridge National Laboratory's Plant and Equipment Division, the same division where Ridenour is employed as an engineering technologist. They got acquainted at Knoxville chapter meetings of the Experimental Aircraft Association (EAA), a non-profit organization devoted to sport aviation -- including assisting the amateur builder. And although they didn't begin work on their crafts at the same time, as work on both moved into the more difficult stages they have shared equipment, tips and encouragement.

How do you start to build your own aircraft?

"The hardest part of the whole thing is making up your mind to crank up on it," Lewis said in a recent interview. "After that it just falls in place and goes!" Well, maybe. First there are blueprints to be ordered ("Select a set has been out at least 10 years," Lewis said, "so that all the defects have come to the top."), parts and equipment to be obtained, and plenty of reading up to do on techniques and methods. (Detailed "how-to" manuals are available through the EAA.)

Both men built their crafts at their homes -- Lewis in his basement, which is accessible through a seven-by-nine foot garage door. Ridenour put the final touches on his in a workshop at the Maryville airstrip he uses as "home base." The wings of both are removable, so that the men were able to transport them from home to airstrip by hauling the fuselage in a trailer.

## Need 'cast iron constitution'

Lewis, who has had his pilot's license since he was 21, has been fascinated by planes and flying since he was a child: "Anytime I could head for the airport, I'd be there." He began

working on his craft -- a "Starduster Too" -- in 1969, although he did not work on it continuously during that time. "It was a thing I'd wanted to do since I was 15 or 16," he said.

According to Lewis, about 90 percent of those who begin work on their own crafts never finish. "You have to have a cast iron constitution, and a unique wife who understands all the problems.

"You assemble and disassemble the craft at least five times during construction. Once the fabric is on, you'll never see that part again -- so you need to make sure it's right."

Ridenour's aircraft is a Volksplane II, which can use a Volkswagen engine -- although he doesn't recommend this, since it must be built up to racing standards to be acceptable. He has used a regular aircraft engine, a 65-horsepower Continental.

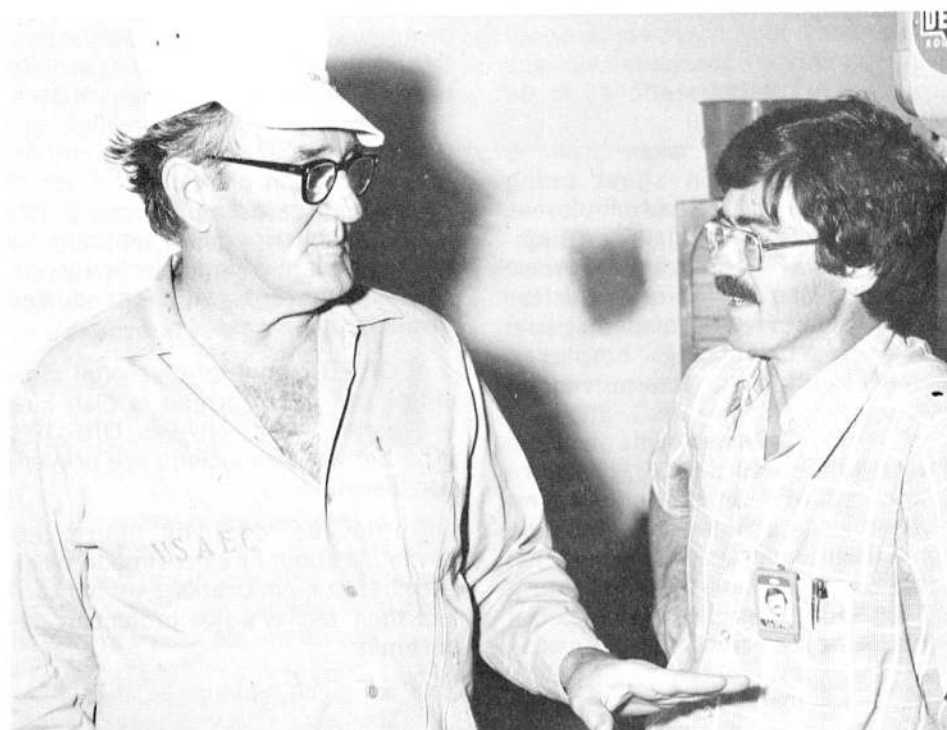
## Lessons were anniversary gift

Ridenour began flying in 1973, when his wife gave him 10 hours of flying lessons as an anniversary present. "It was one of those things I'd wanted to do for a long time, but never got around to before," he said. The idea of building his own aircraft had been in his mind even before he earned his license: "I went to an EAA meeting several years ago, and hung around with the boys afterwards. From listening to them talk about building aircraft I determined I could probably do it myself.

"My craft was started as a group project -- there were about six of us planning to work on it. Later my wife and I bought the group out, because nothing was happening. And it's been all downhill -- or uphill? -- since then."

## FAA regulations

Homebuilt aircraft are subject to certain restrictions imposed by the Federal Aviation Agency. More than 50 percent of the construction must be done by the builder for the craft to qualify as homebuilt. Two FAA inspections are required: one before the fabric is put on -- "before the critical structural points are covered," as Ridenour explained -- and another after completion. If both inspections are satisfactory, the craft is issued a temporary air-worthiness certificate. Then the builder must log 50 hours of flying time in the craft -- with no passengers and within a 25-mile radius of the "home" airport.



Lewis (left) and Ridenour discuss the fine points of home-built aircraft construction.

To date, Ridenour has logged eight hours, Lewis a little over ten. "It takes about a year to get your 50 hours," Lewis said. "You'd have to literally live in the aircraft to do it in less time." He noted that the restriction time provides exposure to a variety of weather conditions.

## EAA lent helping hand

Both men cite the EAA as one of the major driving forces during the construction of their crafts. (Ridenour is currently president of the organization's local chapter; Lewis is a past president.) "I recommend it to anyone wanting to build their own craft," Ridenour said. "You can draw on a vast amount of experience in the group -- it points you in the right direction." Members share tools and act as each others' inspectors as their work progresses, he said.

The Knoxville EAA Chapter, with about 20 active members, meets the last Friday of each month at the Sky Ranch on Alcoa Highway. Meetings are open to the public.

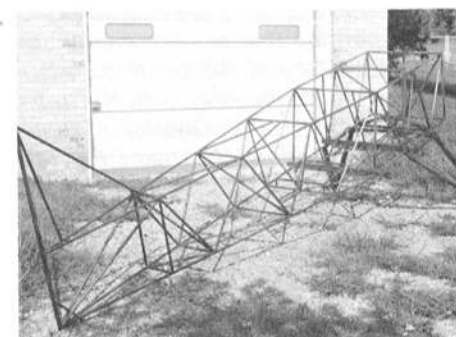
## 'You wonder how it will do!'

After earning air-worthiness certificates for their crafts, the men had one more "hump" to get over -- their first flights in their own machines. "You wonder how it will do beforehand," Lewis recalled.

Ridenour said he decided against wearing a parachute on the first trip because "frankly, I'm afraid to jump. In any situation short of a wing coming off, you'd be better off just to ride it down -- and try to hit the softest, cheapest thing you can as slowly as possible!"

But both maiden flights, as might be predicted from the care the two put into the aircraft, came off without a hitch. And weekends and holidays find them airborne, working on those 50 hours. Was it worth the time and effort put into the construction?

"One hour of flight time," Lewis said, "erases about 5,000 hours of battle fatigue!"



The answer to the question posed on page one: It's the fuselage of Lewis' aircraft, snapped before the fabric was applied.

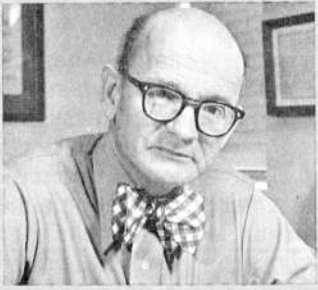


Lewis and son Eric look over his "Starduster Too," checked out and ready for flight.



Ridenour takes to the air in his Volksplane II.





## Xeroradiography of the breast

by T. A. Lincoln, M.D.

*(Editor's Note: Dr. Lincoln alternates his regular column with "The Medicine Chest," where he answers questions from employees concerning health in general. Questions are handled in strict confidence, as they are handled in our Question Box. Just address your question to "Medicine Chest," NUCLEAR DIVISION NEWS, Building 9704-2, Stop 20, Y-12, or call the news editor in your plant, and give him or her your question on the telephone.)*

The early diagnosis of breast cancer has been greatly improved by a relatively new X ray technique called xeroradiography. Although X ray studies of the breast, called mammograms, have been widely used for over ten years, the newer technique has come into widespread use in only the past three years. The question now is, should xeroradiography of the breast be used as a screening technique to try to detect early cancer before any lump can be felt? Is the benefit worth the risk of repeated X ray exposure to mostly normal breasts? What is the proper role of this new technique in the diagnosis of breast abnormalities?

Xeroradiography was developed by the same company that developed the Xerox machine. The main difference is the use of X ray energy, which goes through a tissue, rather than light, which is reflected off a piece of paper. Diseased areas of a breast are often of sufficiently different density to be identified and delineated by this technique.

### Uses electrostatic charge

Ordinary X ray mammography does not produce good contrast between large areas of uniform density of the normal breast and the subtle lines, points and edges produced by diseased areas that are of only slightly different density.

The xeroradiographic plate which replaces the X ray film has an aluminum base, on the surface of which has been deposited a thin glassy layer of selenium. An electrostatic charge is placed on the plate in darkness and then it is exposed to the X ray beam which comes through the breast. During the exposure, the charge on the surface of the plate is partially discharged, depending on how much X ray comes through the tissue.

The plate is developed in a closed chamber, into which an oppositely charged fine blue plastic powder has been sprayed. The particles of the powder adhere to the plate, depending on the difference in charge. A denser area in the breast allows less X ray to be transmitted, causing more of the charge on the plate to remain and therefore to attract more powder. The image is transferred to paper and is fixed by heat and a permanent copy made.

### Cancer identified

When one compares an ordinary X ray mammogram with a xeromammogram, the fantastic increase in detail is immediately apparent, even to the complete amateur. Breast cancers are identified by finding a small area of increased density (called a

mass) by areas of calcification or by abnormalities in the hundreds of tiny ducts.

Most cancers are found because masses of varying sizes and shapes are seen. They may have sharp needle-like structures on the surface or distributed throughout. Others can be divided into a small number of lobes or they can be covered with tiny bumps. Sometimes they are smooth or irregular, or they can be diffuse and vague in outline.

### Biopsy surgeon's decision

Obviously it requires a great deal of experience and skill to be able to tell with some assurance that a given area is sufficiently abnormal to require a biopsy. Although many times the radiologist can almost be certain a mass is malignant, his principal role is to find the abnormality, describe it and give his best judgment, leaving the final decision whether or not to biopsy the lesion to the surgeon. The false positive rate for a good interpretation is only about ten percent.

Surgeons used to feel that if they couldn't feel a lump in the breast there was nothing there. They now know that their fingers are far less sensitive than the mammogram. A sobering experience for a surgeon is to refer a patient for a mammogram because of a lump in one breast, only to find that it appears to be benign. Then a suspicious area is found in the opposite breast in which no lump could be felt!

### Former employee

Dr. Arthur Upton, formerly of the ORNL Biology Division and now Dean of the new School of Medicine at Stony Brook University in New York, is head of one of three panels appointed to advise the National Cancer Institute whether it is safe to use xeromammography for screening purposes. Although there are differences in the recommendations of these panels, they generally agree that caution is wise.

A normal woman has one chance in 14, or 7 percent, of developing breast cancer in her lifetime. It is believed that a single mammogram using the best low dose xeroradiographic process, will increase that risk on the average to about 7.07 percent. In a large study done in the Health Insurance Plan of New York City, a one-third reduction in breast cancer mortality was achieved with screening, but it was only apparent in women over 50. One reason for conservatism is that screening tended to find slow-growing cancers which might have still had a reasonably good prognosis if detected a little later. In women less

than 45-50, tumors are less common and less curable. Screening every year or two would subject young women to considerable radiation exposure with only a small number of curable cancers discovered.

Although there are many radiologists who maintain that screening of women over 35 is still valuable, others feel that screening should be reserved for women 50 and

over. As a diagnostic test whenever there is any reason to be concerned about an abnormality or the likelihood of developing cancer, everyone agrees that xeroradiography is an extremely valuable technique. Eventually, ways may be found to reduce the radiation exposure low enough to make routine screening of young women safe and effective, but it probably should be deferred for now.

## Y-12 organizational changes

(Continued from page one)

Engineering Department Superintendent, succeeding Bostock.

William S. Dritt is appointed Quality Evaluation Department Superintendent, replacing Thompson.

### Joined staff as chemist

Williams, a native of Cosby, Tenn., was graduated from the University of Tennessee in 1943 where he received a bachelor of science degree in chemistry.

Following graduation he joined the staff of the Y-12 Plant as a junior chemist. Over the years he has been given positions of increasing responsibility, serving as an instructor, technical supervisor, process general foreman, senior chemist, department superintendent and Division superintendent.

He is married to the former Frantie Rich; the couple has one son. They live at 701 West Hills Road, Knoxville.

### 16 years at Y-12

Bostock, a native of Philadelphia, Pa., received his bachelor's degree in industrial engineering from Pennsylvania State University and his master's degree in industrial management from the University of Tennessee.

He joined Union Carbide's Nuclear Division in 1957 and was assigned to the barrier manufacturing operation at the Oak Ridge Gaseous Diffusion Plant. He was transferred to Y-12 in 1960 where he has held positions in dispatching, management systems and production control functions.

Bostock is married to the former Dorothy Allison. The Bostocks and their three children live at 924 West Outer Drive, Oak Ridge.

### Headed quality evaluation

Thompson, originally from Atlanta, Ga., received his bachelor of science degree in electrical engineering at Vanderbilt University. He served in the U.S. Navy for two years at the Bureau of Ordnance in Washington, D.C.

He joined the Y-12 Plant in 1961 and has served in a number of technical and supervisory capacities. Since 1972, he has headed the quality evaluation department. He is presently the United Fund coordinator for the Y-12 Plant.

He is married to the former Dorothy Akers. The Thompsons and their three children live at 25 Windhaven Lane, Oak Ridge.

### Metallurgical engineer

Dritt, born in Fort Wayne, Ind., received his bachelor of science degree in metallurgical engineering from the Case Institute of Technology in Cleveland, Ohio.

He joined Union Carbide in 1950 as a metallurgical engineer at ORGDP and became the superintendent of the metallurgy department. He transferred to Y-12 in 1968 as a development section head in fabrication systems. In 1975, he was appointed manager of project development for Y-12.

His wife is the former Wilda Futhey and they have five children. The Dritts reside at 103 Euclid Place.

## nuclear division news

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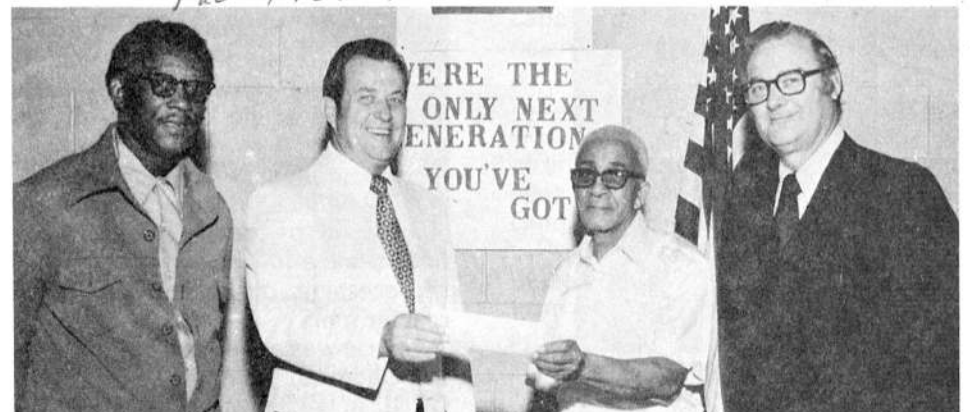
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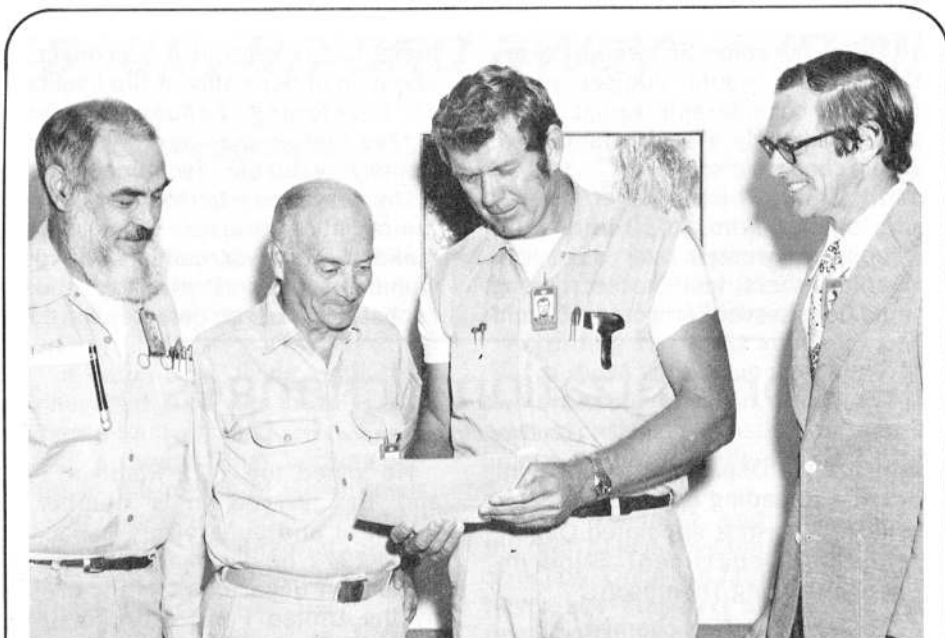
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**CARBIDE SUPPORT FOR PADUCAH BOYS CLUB**—A \$1,000 contribution from the Corporation recently was presented to the Paducah Boys Club to support a drive to upgrade recreation facilities at the club. The presentation was made by Clyde C. Hopkins, Manager of the Paducah Gaseous Diffusion Plant. From left are Frank Brown Jr., general chairman of the drive; Hopkins; Oscar Cross, founder of the Paducah club; and Arthur K. Edwards, Plant Employee Relations Superintendent.





Jim Skidmore (second from right) shows his letter of commendation to J. A. Wallace (left), steward of the Atomic Trades and Labor Council, and ATLC President Norman L. Beeler. The letter was presented to Skidmore by ORNL Director Herman Postma (right).

## Lineman lauded for emergency aid

Emergency assistance given twice on the same day earned a letter of commendation for an Oak Ridge National Laboratory lineman last week.

James W. Skidmore, Plant and Equipment Division, received the letter from ORNL Director Herman Postma last Thursday, commending him for his actions in two separate incidents which occurred a week earlier.

Skidmore was a member of a crew working at ground level when another lineman, James Womac, was seriously injured in an arc flash while working in a "cherry picker" insulated bucket near a high-voltage pole structure September 16. Skidmore and his co-workers lowered the bucket, extinguished burning clothing and carried Womac to a waiting ambulance stretcher, then remained on the scene to assist ORNL and ERDA investigating teams in reconstructing the incident.

Later that afternoon, Skidmore drove to Oak Ridge Hospital to

check on Womac's condition and talk with his family. Returning to his Loudon County home afterwards, Skidmore spotted the ORNL ambulance by the side of the road and stopped. Upon learning that the ambulance crew needed help, he rode with them to Knoxville's Park West Hospital and gave emergency assistance to ORNL employee James English, who had suffered a heart attack.

Postma cited Skidmore for his "speedy and professional reaction" to both emergency situations. "You exhibited courage and deep concern for your fellow man," the letter continued.

Skidmore said he has had two first aid courses at Oak Ridge National Laboratory but no specialized training.

"While many ORNL people were involved in handling the two emergencies, this day was a rare one for Jim Skidmore," said Harry E. Seagren, director of the Plant and Equipment Division. "We're proud to have him on our team."

## 'IR 100' awards announced

(Continued from page three)

low in electrical resistance, is placed in a heater, much like a microwave oven, and heated in very small sections from bottom to top.

The heat is carefully controlled, allowing only the inner core of metal and oxide to melt. The melted material is then cooled so that the oxide metal fibers solidify in unison within the rod. After the rod is cooled, its outer surface is machined away, exposing the metallic fibers and oxide matrix inside.

The technique yields from one to 20 million fibers per square centimeter. These fibers are from one-tenth to five microns (one thousandth of a millimeter) in diameter, of equal length and have identical characteristics.

A mathematical model describing the general process was developed by theoretical researchers from Carnegie-Mellon University under contract with ERDA. This model significantly accelerated the scientists' ability to control and extend this technique.

### Biological waste treatment

Alicia Compere and William Griffith, of the Chemical Technology Division, are primary developers of the ANFLOW system, which is a technique for treating liquid wastes biologically. Special ceramic materials which greatly simplify full-scale installation and make the system commercially feasible were developed by Googin and Smith.

In ANFLOW (for anaerobic, upflow, packed-bed bioreactor), microorganisms are coated and anchored to a specially coated chemical process packing inside a column. The stream to be processed is passed up through the packing bed, taken up by the microorganisms and broken down into smaller molecules, producing a

cleaner waste stream. ("Anaerobic" refers to the fact that oxygen is not required for operation of the system.)

ANFLOW may be used to perform biochemical conversion, fermentations and waste water treatment on either a continuous- or semi-batch basis, but it differs from conventional industrial fermentation and waste treatment processes. Most industrial fermentations are performed on a batch basis in stirred tanks. Conventional activated-sludge liquid-waste treatment is performed on a continuous basis, but requires oxygen.

As a continuous process, ANFLOW may permit the use of smaller fermentation vessels. Since air is not required during processing, the micro-organisms grow and die at a much slower rate, thereby producing less waste sludge than both the industrial fermentation and activated sludge processes. It also has been demonstrated that an ANFLOW unit can efficiently treat wastes at temperatures between 60 to 75 degrees F., while conventional systems require temperatures above 85 degrees for treatment.

In addition to being a potentially more effective, more economical method for treating liquid waste, ANFLOW has significant energy conservation potentials. These relate not only to the production of a useful fuel gas (methane in the case of municipal sewage), but also to the expected reduction on fuel consumed by the process itself due to the lower temperature at which it operates.

The Oak Ridge researchers have operated several experiments, both in a laboratory setting and at a sewage treatment plant in the city of Oak Ridge. The process shows promise for treating several different types of wastes in addition to domestic sewage.

A pilot plant to demonstrate this energy-conserving process for treating liquid wastes is currently being constructed as a cooperative project by the Energy Research and Development Administration, the city of Oak Ridge and the Norton Company.

### next issue ...

The next issue will be dated October 14. The deadline is October 6.

## System Studies manager for OWI



Robert S. Lowrie

Robert S. Lowrie has been appointed manager of systems studies for the Office of Waste Isolation. In this capacity, he will be responsible for directing general systems studies related to the National Waste Terminal Storage program.

A native of Medina, N.Y., Lowrie attended the University of Michigan where he received a bachelor's degree in chemical engineering. He has also taken some graduate work in engineering at the University of Tennessee.

He joined the staff of the Y-12 Plant in 1944 where his activities included studies of the recovery of uranium from shale and western ores, and the reprocessing of commercial power reactor fuels.

Lowrie was appointed to the staff of the Chemical Technology Division at ORNL in 1959 where he worked on various aspects of the fuel cycle and was a member of the geologic disposal evaluation group.

He is married to the former Janet Boerker, and the couple has four sons. The Lowries live at 107 Peach Road, Oak Ridge.



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